DOCUMENT RESUME

ED 306 020 PS 017 948

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TITLE Parental Goals and Child Self-Regulation.
PUB DATE Apr 89
NOTE 35p.; Paper presented at the Biennial Meeting of the Society for Research in Child Development (Kansas City, MO, April 27-30, 1989).
PUB TYPE Reports - Research/Technical (143) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS Child Rearing; *Competence; *Disabilities; Language Usage; *Parent Influence; Parenting Skills; *Performance Factors; *Self Care Skills; *Severe Mental Retardation
IDENTIFIERS *Self Regulation

ABSTRACT

Participating in an initial investigation of parental goals and guidance techniques related to child self-regulation, 15 parent-child dyads were videotaped in their homes while engaged in four functional tasks: a laundry folding task, an animal matching task, while mixing a snack, and while putting on a smock. The children, averaging 7 and one-half years of age, were classified as severely mentally retarded or severely physically disabled. Children were instructed by the parent to execute each of the four functional tasks, and each was executed under a different goal condition: efficiency, independence, teaching, and a neutral control. Indices of effective parental guidance and of child regulation were derived from transcribed videotapes. In addition, adaptive behavior, verbal intelligence, and memory were assessed. Although parental regulatory strategies were not significantly associated with the stated goal of the task, both groups of children showed a significant decrease in other-regulated behavior during the independence condition. Parents of children with orthopedic handicaps used a higher percentage of structuring statements during the independence condition than did parents of children with mental retardation. Within each of the four goal conditions, the extent to which the child exhibited self-regulated behaviors was associated with parental guidance strategies. Results are interpreted in terms of Vygotsky's social-developmental theory. Implications for the development of competence in children with mental retardation are discussed. (RH)

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Parental Goals and Child Self-Regulation

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PS 017948

Poster presented at the April, 1989 Biennial Meeting of the Society for Research in Child Development, Kansas City, Missouri. This research was supported by a USC Research and Productive Scholarship grant. Address correspondence and reprint requests to Keri Weed, Department of Psychology, USC Aiken, 171 University Parkway, Aiken, South Carolina 29801.

Abstract

The present study was an initial investigation of parental goals and guidance techniques related to child self-regulation. Fifteen parent-child dyads were video taped in their homes while engaged in a laundry folding task, an animal matching task, while mixing a snack, and while putting on a smock. Children (average age = 7 1/2) had been classified as either severely mentally retarded (n=9) or severely physically disabled (n=6). Each of the four functional tasks was executed under a different goal condition: efficiency, independence, teaching, and a neutral control. Indices of effective parental guidance and of child regulation were derived from transcribed video tapes. In addition, adaptive behavior, verbal intelligence, and memory were assessed. Although parental regulatory strategies were not significantly associated with the stated goal of the task, both groups of children showed a significant decrease in other-regulated behavior during the independence condition. In addition, parents of children with orthopedic handicaps used a higher percentage of structuring statements during the independence condition than did parents of children with mental retardation. Within each of the four goal condition, the extent to which the child exhibited self-regulated behaviors was associated with parental guidance strategies. Results are interpreted in terms of Vygotsky's social-developmental theory. Implications for the development of competence in children with mental retardation are discussed.

Parental Goals and Child Self-regulation

The role of social and cultural influences in the development of children's cognitive competence has been elucidated by a growing body of research. Bruner has been credited with uncovering the social foundations of language and cognition (Olson, 1980). Encouraged by Soviet theorists (e.g., Vygotsky and Luria), Bruner emphasized the importance of social interactions and the internalization of socially and culturally derived information for the construction of knowledge and modes of thought. In addition, Bruner acknowledged the reciprocal impact of these underlying cognitive processes on the creation of social conventions and cultural artifacts.

A primary context for the acquisition of knowledge and modes of thought through social interaction is the family. Research has confirmed that styles of adult-child interactions, including control techniques (Hess and McDevitt, 1984), scaffolding or intersubjectivity (Pratt, Kerig, Cowan & Cowan, 1988; Trevarthen, 1980; Vandall & Wilson, 1987), contingent interaction (Wood, 1980; Rogoff, Ellis & Gardner, 1987), and communication strategies (Heber, 1977), are related to children's cognitive, academic and social competence. Findings have consistently supported the premise that indirect parental guidance, in the form of structuring, strategic questioning and providing relevant task information, is more effective than highly directive forms of assistance, such as completing the task for the child and giving the child specific commands without explanations (Moss, 1985; Rogoff, Ellis, & Gardner, 1984; Webb, 1985).

Several studies have been conducted comparing the interactions of parents and their normal children to those interactions involving a child with developmental delays (Hanzlik & Stevenson, 1986; Davis,

Stroud, & Green, 1988). Investigators have found that mothers of delayed infants and children are more likely to initiate the interaction, and are more directive and controlling than are mothers of nondelayed children (Buium, Rynders, & Turnure, 1974). These interactional differences have potentially negative consequences for the development of mentally retarded children's understanding of the world and their ability to reason about it.

Vygotsky's (1978) theory of the social origin of higher cognitive processes has been proposed as one explanation of the process by which parents effect their children's cognitive competence. According to Vygotsky and related theorists (e.g., Luria, 1961; Wertsch, 1979), parents initially regulate the child's behavior by structuring the task (generating the goals and rules), monitoring the child's adherence to the rules and progress toward the goals, and solving problems, or removing obstacles that block the tasks' completion. Gradually, the verbal and nonverbal strategies the parents use become internalized and the child becomes capable of self-regulation. Therefore, tasks the child could previously do only with the supervision and guidance of another person now become within the scope of the child's independent abilities. If parents of children with developmental delays use less effective guidance techniques, this transition to from other-regulation to self-regulation could be seriously impaired.

One purpose of the present study was to confirm that parental guidance strategies, such as structuring, indirect as compared to direct regulatory statements, and elaborations, were related to children's self-regulation. As children gradually internalize the

regulative strategies provided by the parents, parallel self-regulative strategies should appear in the child's repertoire. In the present study children's task-related behavior was examined for the existence of self-regulative behavior and verbalizations including self-monitoring, problem identification and problem solving, as well as self-initiated verbal and non-verbal elaborations. Hypothesized relationships were examined between the overall level of parental behaviors, the quality of parental guidance strategies and children's self-regulatory behavior and verbalizations.

A second purpose of the present study was to test the hypothesis that the use of effective guidance strategies would depend on the stated or perceived goals of the task. Wertsch, Minick and Arns (1984) invoked the three tiered framework of Leontev (1981) to explain why some parental interactions are more effective than others. This framework focuses first on the "activity", or general cultural framework that participants bring to the interaction. The second consideration involves the "action", or the specific goal-directed activity that the participants pursue. Finally, the "operations", or the strategies that are instrumental in carrying out the task, are considered. In a comparison of mothers and teachers, Wertsch et al. (1984) concluded that teachers were more effective because of how they defined the "activity" required. Whereas "mothers construed the activity setting as 'household work' which predisposed them to pursue the pragmatic goal of helping the children to complete the task efficiently and with few errors, teachers were assumed to construe the setting as one of formal education" (p. 4).

In a more direct investigation of Leontev's activity theory, Renshaw and Gardner (1987) examined parental guidance techniques "in

relation to the goals of playing, teaching, assessing and working, in order to discern which of the four goals was associated with the implementation of more effective teaching strategies by the parents" (p. 6). Mother-child and father-child dyads were video taped as they completed a card-matching task and an animal-matching task. An interview with the parents followed to determine the parents' perceptions of the goals of the task. Renshaw and Gardner concluded that the goal of teaching was consistently associated with more effective parental guidance (e.g., indirect regulation, elaborations) by the parent than was the goal of assessing. The teaching strategy was also somewhat associated with children's use of elaborative labels, the only child variable assessed.

The present study tested the relationship between the task goals and effective parental guidance in an experimental paradigm. Each parent and child completed four tasks in accordance with four different goal conditions. The goals were based on those described by Wertsch et al. (1984) and by Renshaw and Gardner (1987), and included a neutral control, efficiency, independence and teaching. It was hypothesized that the efficiency goal would be associated with more direct, and therefore less effective, parental guidance, while the teaching goal would be related to more effective guidance strategies.

Although the stated or perceived goals of the task may well influence the quality of parental guidance, other factors may also be operative. Evidence suggests that parents vary the complexity and directness of their guidance depending on the age or developmental level of the child (Caldera et al., 1987; McGillicuddy-De Lisi, De Lisi, Flaugher, & Sigel, 1987; Rogoff et al., 1984; Wood, 1980).

According to Bell's (1971) limiting control strategy, if the mother interprets her infant's behavior as inactive, she uses directives to impose more structure upon the interaction in an attempt to elicit a higher level of responsiveness more commensurate with her expectations. Thus, children who are perceived by the parents as less competent, perhaps due to mental retardation or a physical disability, may elicit more direct guidance strategies than more competent or successful children (Wasserman, Allen & Solomon, 1985; Bell, 1971; Whitman, 1987).

The present study compared interactions of parents of children with orthopedic handicaps to those of children with mental retardation. Although both groups of children had moderate to severe defects in daily living skills, the children with orthopedic handicaps were less intellectually delayed. It was hypothesized that parents of children with mental retardation would use more direct regulatory strategies compared to the use of more effective, indirect strategies for parents of children with orthopedic handicaps.

Method

Subjects

Sixteen parent-child dyads were recruited through Children's Rehabilitative Services in a predominately rural, southeastern area. Children had a primary diagnosis of either trainable mentally handicapped or orthopedically handicapped. Classification of the children into the two groups was substantiated by assessments of verbal intelligence and short-term storage space. Children who were considered primarily trainably mentally handicapped received scores of less than 40 on the PPVT-R, and either a 0 or 1 on the assessment of short-term storage space. Children who were considered primarily

orthopedically handicapped received scores of over 40 on the PPVT-R, and from 2 to 4 on the assessment of short-term storage space. Characteristics of the children are listed in Table 1.

Insert Table 1 about here

One child who did not consistently fit into either group was excluded from all between group analyses. One dyad from the trainable mentally handicapped group was also excluded as the mother was unable to understand the task requirements. Finally, due to an error during video taping, a dyad from the orthopedically handicapped group had to be eliminated. Thus, data analyses were conducted on 13 parent/child dyads, 12 mother/child pairs and one father/child pair.

Design

A two (group) x four (condition) factorial design was used. Each parent/child dyad performed four functional tasks, each associated with either a neutral, efficiency, independence or teaching goal. The neutral condition functioned as a baseline in order to assess the level of parental regulation typical for the dyad. The first task was always presented under the neutral control condition. The instructional condition associated with each of the remaining three tasks was randomly assigned for each subject. Tasks were completed in the same order for all subjects.

Tasks

The first task (Smock) required the children to put a lightweight smock on over their clothes. The smock was open down the sides with laces to be tied under the arms. As an alternative to tying, velcro fasteners were available. A frog applique indicated the

front of the smock. To begin, the smock was fastened by velcro on one side, and folded inside of a clear plastic bag. The experimenter gave the bag to the parent with instructions to have the child put the smock on.

The second task (Laundry) required the parent and child to work together to fold three towels (small, medium and large), to match and fold three pairs of socks (one missing), and to stack them together with the socks on top of the towels. The laundry was presented in a standard laundry basket to the parent with an explanation of the task, followed by one of the three instructional manipulations: to do the task as quickly and neatly as possible (Efficiency), to let the child do the task as much as possible on his or her own (Independence), or to work with the child so the child would be able to do it on his or her own the next time (Teaching).

The third task (Animal Matching), adapted from Wertsch, Minick, and Arns (1984), required the parent/child dyad to use four fences to make four corrals, and place groups of two or three animals (cows, chickens, sheep and pigs) into the four corrals to match a model barnyard. Two of the corrals also contained a person: a woman feeding the chickens, and a man tending the sheep. As an added problem, one of the three pigs was purposefully removed from the bag of animals. After these general instructions had been explained to the parent, the goal of the task was stated as for the laundry task.

The final task (Snack) required the dyad to mix equal portions of three ingredients together to make a trail mix. The ingredients included a small box of raisins, a glass jar of peanuts, and a cereal type box of Chex snack mix. These ingredients were presented to the

parent in a standard plastic grocery bag with the general instructions, followed by the specific goal of the task.

Procedure

All procedures were conducted in the dyads' homes by the experimenter and a research assistant. During the first part of the session, children were instructed by the parent to execute the four functional tasks. Each task was first explained to the parent by the experimenter. Parents were required to repeat the task instructions and goal condition correctly before starting the task. Parent/child interactions were video taped by the research assistant for later scoring. During the second part of the session, the experimenter conducted the Q-sort assessment of self-regulation (Weed, 1987), and the Vineland Adaptive Behavior Scales with the parent. While the parent was occupied with these tasks, the research assistant administered the PPVT-R and the Short-term storage space (STSS) assessments to the child. The STSS consisted of the counting sets and CUCUI tasks described by Case (1985). The STSS tasks were selected to assess dimensional operations, presumed to predominate during the stage of concrete operations. The session lasted approximately one and one-half to two hours.

Coding and Reliability

Video tapes were transcribed verbatim by trained research assistants blind to the goal condition. All transcribed video tapes were reviewed for accuracy by the experimenter. The coding system was based on the classification system developed by Moss (1985), and used by Renshaw and Gardner (1987) (see Table 2).

Insert Table 2 about here

All protocols were scored by two independent judges, blind to the goal condition. Disagreements were resolved by the experimenter. Reliabilities between the two coders were calculated for each protocol, separately for each of the four tasks. The average total occurrence reliabilities and kappas across subjects are shown in Table 2 for the task with the lowest and with the highest reliability.

Data transformations

Each of the variables in Table 2 was converted to a percentage, by dividing the number of occurrences by the total number of parental or child behaviors (both verbal and nonverbal). In order to control for task effects within each of the goal conditions, these percentages were standardized separately for each task.

The correlation matrix for the parental measures and for the child measures were examined due to the likelihood of significant relationships among the variables. Consistent, moderate, but mostly nonsignificant, correlations were found between parental regulatory statements and open questions (positive), while negative correlations were found between both of these variables with regulatory directives. As this pattern was predicted based on previous research, these three variables were combined (% regulatory statements + % open questions - % regulatory directives) and constituted the measure of indirect parental guidance. Structuring, closed questions, and negations were not consistently correlated with the other three variables. As specific predictions were not made concerning closed questions or negations, only the measures of indirect parental guidance and

structuring were used in subsequent analyses.

The correlation matrix for the child variables indicated significant and negative relationships between other-regulation and self-regulated behaviors and verbalizations. As other regulation was generally less associated with verbal and non-verbal elaborations, only this variable was used in subsequent analyses. For both the parental measures and the child measures, indices of verbal and nonverbal elaborations were summed for further analyses.

In summary, the four parental dependent variables were 1) overall level of parental behaviors, 2) percent indirect regulatory statements, 3) percent structuring statements, and 4) elaborations. The three child dependent variables included 1) overall level of child behavior, 2) other-regulated behavior and verbalizations, and 3) elaborations.

Results

Goal Condition Effects on Parental and Child Regulation

To test the hypothesis that effective parental guidance would depend on the instructional goal condition each of the four parental dependent variables: total behaviors, indirect statements, structuring and elaborations, was analyzed with 2 (group) x 4 (condition) mixed analyses of variance with repeated measures on the condition factor. A MANOVA approach to the repeated measures was used which allows for deviations from sphericality assumptions, and provides a conservative estimate of repeated measure effects (Hertzog & Rovine, 1985). No significant goal condition effects nor interactions between goal condition and group were found.

Since specific planned comparisons were hypothesized, additional

t-test analyses were conducted comparing the four parental variables between the teaching and efficiency conditions (Hertzog & Rovine, 1985). Results of the t-test comparisons indicated that parents engaged in significantly more behaviors during the teaching condition than during the efficiency condition ($t(14) = 2.37$, $p<.05$). Separate t-tests conducted for the two groups indicated that parents of children with trainable mental handicaps did not differentiate between the two conditions while the parents of the children with orthopedic handicaps did (see Table 3, $t(5) = 2.26$, $p<.1$). Parental use of effective regulatory strategies was not significantly related to the goal condition.

Insert Table 3 about here

The three child variables: total behaviors, percent other-regulated, and elaborations, were also analyzed with 2 (group) x 4 (condition) mixed analyses of variance. A marginally significant multivariate main effect for goal condition was obtained for the total number of child behaviors, $F(3,9) = 3.06$, $p<.1$ (see Table 4). T-test comparisons indicated that children performed more behaviors during the teaching condition than during the efficiency condition, $t(14) = 2.95$, $p<.025$. Separate t-tests conducted for each group indicated that only the children with orthopedic handicaps engaged in more behaviors during the teaching condition, $t(5) = 6.14$, $p<.01$.

Insert Table 4 about here

A significant multivariate condition effect was also obtained for other-regulated behavior, $F(3,9) = 3.96$, $p<.05$ (see Figure 4).

Follow-up t-tests indicated that although children with orthopedic handicaps had a lower percentage of other-regulated behaviors during the teaching condition than during the efficiency condition, the effect was not significant. The multivariate condition effect was apparently due to the decreased percentage of other-regulated behavior for both groups during the independence condition as compared to the efficiency condition. No significant condition effects were found for child elaborations.

Summary. The experimental manipulation produced hypothesized differences in the absolute level of parental behavior associated with the goal condition. Although measurable differences were not found in the quality of parental strategies used, condition related differences were found for child regulation. This suggests that the manipulation produced more subtle changes in parental behavior which were not associated with the measured variables.

Between Group Effects

The hypothesis that effective parental guidance would depend on characteristics of the child was partially supported. It was expected that parents of children with orthopedic handicaps would use more indirect guidance, and more structuring, than parents of children with mental retardation. Between subject effects in the MANOVAs for the total parental behaviors and for parental guidance strategies were examined. Significant effects were obtained for parental use of structuring statements, $F(1,11)=12.13$, $p<.01$, with parents of children with orthopedic handicaps using more structuring than parents of trainably mentally handicapped children (see Table 3). Tukey tests indicated the greater use of structuring by parents of children with

orthopedic handicaps reached standard significance levels only during the independence condition. Although results for the measure of indirect parental guidance did not reach significance, $p<.15$, all means were in the hypothesized direction. No between subjects effects were found for the total number of behaviors nor for parental elaborations.

The MANOVAs of the three child variables were also examined for between subject effects. Significant effects were obtained for other regulated behavior, $F(1,11) = 5.09$, $p<.05$ (see Table 4). Follow-up Tukey tests indicated the differences only reached significance during the teaching condition. No significant group effects were obtained for total number of child behaviors nor for child elaborations.

Summary. Significant between group effects were obtained for both parental behavior and for child behavior. However, while the teaching condition was the context for increased differentiation of the children's behavior, it was not associated with group differences in parental behavior. In contrast, during the independence condition, where parental differences were most apparent, differences in child regulation did not reach significance.

Correlations between parent and child regulation

Pearson's correlations were used to further analyze the relationships between the four parental guidance measures and the three measures of the child's behavior, separately for each condition. All children for which there was complete data (N=15, and N=16 for efficiency) were included in these analyses. The total number of parental behaviors was significantly correlated with the total number of child behaviors for all conditions (see Table 5). Except for this consistent relationship, the correlational patterns depended on the

specified goal of the task.

Insert Table 5 about here

Parent's use of indirect as opposed to direct regulatory statements was not related to children's other-regulated behavior as predicted. However, during the efficiency and independence conditions, indirect statements were associated with children's greater use of verbal and non-verbal elaborations. The relationship between indirect regulatory strategies and child elaborations could not be assessed during the neutral control condition due to a floor effect for child elaborations.

Parental use of structuring was at least marginally associated with children's regulation during three of the four goal conditions. During the neutral and independence conditions, parental structuring was associated with lower percentages of other-regulated behaviors, while during the teaching condition a positive correlation was obtained between structuring and other-regulated behavior. Parental verbal and non-verbal elaborations were not consistently associated with children's regulatory behavior, although the relationship was significant in the neutral condition.

Finally, the total amount of parental behavior was associated with child self-regulation, although the direction of effect depended on the goal of the task. It is possible that during the teaching and independence conditions, parents intervened only when their children were not regulating their own behavior. Thus, the less the children did on their own, the more the parents had to complete the task for the child. However, during the neutral condition parents of less

competent children engaged in fewer behaviors with their children.

Correlations between parental guidance and child characteristics

One assumption of the present study was that the quality of parental guidance elicited by the experimental manipulation was indicative of the typical interactions between parent and child. If this assumption is valid, then relationships should exist not only between task specific variables, but also between parental guidance and other child characteristics. In order to assess these relationships, parental guidance measures were aggregated over the four goal conditions. Pearson's correlations were then used to analyze the relationships between both level and quality of parental guidance with measures of verbal ability, adaptive behavior, age and short term storage space (see Table 6). Significant relationships were found for parental indirect regulation, and for structuring, but not for parental elaborations nor for the overall level of parental behaviors.

Insert Table 6 about here

Discussion

The purpose of the instructional manipulation was to alter the quality of guidance strategies used by parents of children with cognitive and physical handicaps. More effective strategies were expected if parents believed the goal of the task was to teach their children than if they were merely trying to get the task done as efficiently as possible. The independence condition was included to assess the optimal level of child self-regulation, while the neutral condition functioned as a baseline to assess the typical parent-child interaction. In order to evaluate the success of the instructional manipulation, it is first necessary to re-examine the criteria used to define an effective guidance strategy.

Effective parental guidance strategies were defined based on past research as well as on their consequences for child self-regulation. Past research has suggested that structuring statements, indirect as opposed to direct strategies, and elaborations were preferable. None of the previous research, however, has examined the effect of these parental guidance strategies on child self-regulation in functional contexts. It is possible that different parental guidance strategies are related to child self-regulation, than to task completion, number of errors, or to child verbalizations.

The instructional manipulation was partially successful in altering the parental guidance strategies. Although parents of children with orthopedic handicaps engaged in more behaviors during the teaching as opposed to the efficiency condition, parental regulatory strategies were not significantly associated with the stated goal of the task. The extent to which children regulated their own behavior was, however, associated with the goal condition. Both

groups of children showed a significant decrease in other-regulated behavior during the independence condition. Although correlational analyses suggested that other-regulated behavior during the independence condition was associated with parental structuring, parental changes in structuring as a result of the manipulation were nonsignificant. It is possible, therefore, that the instructions altered an unmeasured aspect of parental behavior, resulting in changes in child self-regulation during the independence condition.

Since the overall level of behavior did change as a result of the manipulation, and since there was a significant child effect associated with the goal condition, the nonsignificant effects of parental guidance cannot be attributed to parents not responding to the instructional goal. Instead, it seems likely that the regulatory strategies parents typically use are subtle, ingrained behavior patterns, not easily changed by brief instructions.

Davis et al. (1988) suggested that parents of children with mental retardation or physical disabilities were more likely to adopt a teaching mode during regular interactions with their children than parents of nondisabled children. Thus, their interactional style would not change from a free-play situation to a teaching situation. The present data suggesting consistency in behavior across conditions by parents of children with mental retardation appear to support the conclusions of Davis et al. Parents of children with orthopedic handicaps, however, did increase the level of their behavior during the teaching condition. On initial inspection, it appears that parents of children with mental retardation were always behaving as parents of children with orthopedic handicaps did during the teaching

condition.

It is instructive, however, to examine the types of parental behavior accounting for the differences found during the teaching condition. Examination of the between group comparisons suggested that the greater amount of behaviors by parents of trainably mentally handicapped children was not due to structuring, but rather to the use of direct as opposed to indirect regulatory statements. This pattern suggests that parents of these children are not really engaging their children with more effective teaching strategies, but rather giving more commands to get the task completed. Similarly, the increase in overall levels of behavior for parents of orthopedically handicapped children was not accompanied by significant increases in indirect guidance, nor in structuring. Furthermore, correlational analyses suggested that the greater number of parental behaviors during teaching was associated with higher, not lower, percentages of other-regulated behavior. Therefore, it appears that a goal of teaching may not provide the optimal setting to encourage children's self-regulation.

Parental structuring was expected to provide the child with the tools needed to independently pursue the goals of the task. In order to make progress on any novel task, a child must know what end result is expected and the rules to be followed to achieve the desired result. Without this knowledge, the child either depends on step-by-step instructions from an adult tutor, or else imposes his or her own interpretation of the meaning of the task. The situation is somewhat analogous to trying to complete a jigsaw puzzle without first having seen what the finished product is supposed to look like.

Although negative correlations between parental structuring and

children's other-regulated behavior in the neutral and independence conditions may provide some support for the importance of parental structuring, three important issues need to be addressed. The first issue concerns whether or not all of the children would be able to use the tools provided by the parental structuring. Perhaps some, limited in cognitive and verbal abilities, would be unable to understand the task goals; others, limited by physical disabilities, might understand but be unable physically to follow through. Although results are necessarily suggestive due to the small sample, separate correlations for the two groups of children revealed that the obtained relations between parental structuring and child self-regulation were present only for children with orthopedic handicaps.

The second issue involves interpretation of the direction of effects. An alternative, yet plausible explanation, of the data is that children who exhibit more self-regulated behavior evoke more structuring statements from adults with whom they are interacting. Parents who perceive their children to be more competent have higher expectations and may thus provide the tools they believe appropriate to the child's developmental level. Similarly, consistent with Bell's (1971) limiting control strategy, children who are perceived as less competent may elicit more direct guidance, and by inference, less indirect guidance or less structuring.

Both interpretations of the direction of effects are incompatible with the positive relationship obtained between structuring and other-regulated behavior during the teaching condition. During the teaching condition, higher, not lower, levels of other-regulated behavior were associated with parental structuring. The correlation was positive

for both groups, although stronger for the children with orthopedic handicaps. While it is not inconceivable that parental structuring would cause more other-regulated behavior, a more congruent explanation is that parents were compensating for their children's low ability levels by trying to provide better explanations and more structuring. Thus the direction of effects would be from child to parent.

The third issue raised by the within task correlations concerns the implications for Vygotsky's social developmental theory. According to Vygotsky, as parental regulatory strategies become internalized by the child, the child assumes the regulatory role once provided by the parent. This internalization process is the result of repeated social interactions between the parent and the child. Although the present study did not directly examine this internalization process, a critical prerequisite is to confirm that parental regulation is related to child regulation at one point in time. The present study provided little support for this perspective. While significant relationships were found between parent and child regulation, it is impossible with these data to substantiate the causal influence of parental guidance.

Implications of these results for enhancing the self-regulation of children with mental retardation or physical handicaps are necessarily suggestive. Both groups of children exhibited more self-regulation during the independence condition. It is possible that more extensive parental intervention aimed at encouraging their children to complete tasks as independently as possible would enhance the extent of child self-regulation. Perhaps recognition of the potential for greater independence would result in changed parental

expectations for the child and thus a greater use of more effective guidance strategies.

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TABLE 1

Subject Characteristics

Age	Race	Sex	Physical disability	PPVT	Daily Living[a]	STSS
Trainably Mentally Handicapped						
4,6	W	F	infantile spasms	< 40	100	0
6,0	B	M	none	< 40	65	1
6,0	W	M	Down Syndrome	< 40	78	0
8,0	B	F	hyperactivity	< 40	47	0
8,3	W	F	Down Syndrome	< 40	44	1
9,0	W	M	none	< 40	20	1
11,3	W	M	Down Syndrome	< 40	20	0
7,6				< 40	53.4	.43
Orthopedically Handicapped						
5,11	W	M	hearing impairment	62	113	3
6,8	W	F	multiple birth defects	124	104	4
6,11	W	M	cerebral palsy	74	38	3
7,3	B	M	hydrocephalus	45	43	3
8,0	B	F	hearing impairment	x	90	4
8,6	W	F	seizure disorder	57	55	2
7,3				72.4	73.8	3.17

[a] from Vineland Adaptive Behavior Scales

TABLE 2

Coding of Parental and Child Regulatory Statements and Behaviors

Variable	Description	Example	Reliability[a]
Parental Variables			
Structuring	specification of goals, explanation of rules, how-to information	"You gonna fold these towels, and you gonna match the socks, and we gonna place 'em on top of the towels"	.93 - .96 .51 - .74
Regulatory Directives	commands requiring a direct, immediate response by the child	"Put this one over here"	.91 - .92 .76 - .82
Closed Questions	functioned as directives although in question form	"Is there another one like that in there"?	.97 - .98 .77 - .86
Negations	stopped child's current behavior	"No" "Wait a minute"	.98 - .99 .65 - .85
Regulatory Statements	information about materials, task attributes, progress toward goals, and evaluation of that progress	"We have Chex, and peanuts, and raisins" "We just have one more to go"	.87 - .91 .50 - .75
Open Questions	questions requiring more that just a yes or no response	"What else do we need in with the sheep"?	.98 - 1.0 .91 - .95

Variable	Description	Example	Reliability[a]
Child variables			
Other-regulated Behavior	Any verbal or non-verbal behavior directly following a Regulatory Directive, Negation or Closed or Open Question	Takes socks out of basket in response to parental command	.83 - .87 .63 - .76
Self-regulated Behavior	Self-initiated behavior, monitoring, problem finding or solving	After folding a towel as requested, laying it on the stack	.85 - .91 .65 - .74
Self-regulated Verbalizations	All task-relevant verbalizations, not in response to direct parental requests	"What is it"? "Do this for me"	.94 - .96 .71 - .86
Variables coded for both parent and child			
Verbal Elaboration	Verbal labelling of task-related material	"Put the man in with the sheep" "It's a red sock"	.86 - .995
Non-verbal Elaboration	Use of gesture, such as pointing, to clarify verbal statement	Touches figure of man while saying, "Put that over there"	.96 - .995

[a] Total occurrence reliabilities given first, followed by kappas

TABLE 3

Parental Guidance z-scores by Goal Condition

	Goal Condition			
	Neutral	Efficiency	Teaching	Independence
Total Behaviors				
Orthopedically	-.35	-.48	.32	-.55
Handicapped	(.59)	(.47)	(1.26)	(.73)
Trainably Mentally	.49	.12	.38	.23
Handicapped	(1.22)	(.91)	(1.03)	(1.26)
Indirect Guidance				
Orthopedically	.74	2.13	.90	.42
Handicapped	(2.04)	(3.05)	(1.89)	(2.82)
Trainably Mentally	-.81	-.79	.11	-.70
Handicapped	(2.13)	(2.89)	(1.92)	(1.31)
Structuring				
Orthopedically	.41	.45	-.14	1.22
Handicapped	(1.36)	(.91)	(1.0)	(.79)
Trainably Mentally	-.35	-.25	-.42	-.32
Handicapped	(.71)	(.83)	(.83)	(.98)
Elaborations				
Orthopedically	.41	.10	-.72	-.15
Handicapped	(.35)	(1.22)	(.96)	(.70)
Trainably Mentally	.47	.90	.40	-.57
Handicapped	(.12)	(.77)	(.99)	(2.22)

Note: Standard deviations are in parentheses

TABLE 4

Child Regulation z-scores by Goal Condition

	Goal Condition			
	Neutral	Efficiency	Teaching	Independence
Total Behaviors				
Orthopedically	-.18	-.57	.57	-.24
Handicapped	(.87)	(.59)	(.99)	(.54)
Trainably Mentally	.30	.04	.31	.28
Handicapped	(1.24)	(.91)	(1.15)	(1.17)
Other-regulated Behaviors				
Orthopedically	.21	-.17	-.65	-1.06
Handicapped	(1.33)	(.81)	(.91)	(.71)
Trainably Mentally	-.05	.65	.52	.00
Handicapped	(.92)	(.93)	(.66)	(1.12)
Elaborations				
Orthopedically	.05	-.03	.03	1.10
Handicapped	(.11)	(1.26)	(1.95)	(2.28)
Trainably Mentally	.03	-.86	-.14	-.35
Handicapped	(.07)	(1.37)	(1.64)	(1.71)

Note: Standard deviations in parentheses

TABLE 5

Parental Guidance Strategies and Child Regulation

	Indirect	Struct.	Elabor.	Total
Neutral Condition				
Other-regulation	-.21	-.45*	-.65***	-.45*
Total behaviors	.17	.14	.40	.84***
Efficiency goal				
Other-regulation	.02	-.27	-.31	.32
Elaborations	.51**	.11	.03	-.02
Total behaviors	.41	.34	.39	.88***
Teaching goal				
Other-regulation	.16	.47*	.06	.48*
Elaborations	.30	.13	-.30	.24
Total behaviors	.41	.34	-.57**	.78***
Indpendence goal				
Other-regulation	.02	-.64**	-.09	.60**
Elaborations	.55**	-.02	-.30	-.17
Total behaviors	.20	-.29	-.25	.89***

Note: * p<.10
** p<.05
*** p<.01

TABLE 6

Pearson's Correlations Between Parental Guidance Strategies and Child Characteristics

	Indirect	Struct.	Elabor.	Total
Age	.02	-.04	-.02	.37
STSS	.56**	.45*	-.19	-.25
PPVT	.38	.53*	-.20	.12
Vineland -				
communication	.45*	.58**	-.15	-.11
daily living	.29	.28	-.19	-.24
social	.48*	.39	-.07	-.05
total score	.48*	.52**	-.17	-.20

Note: *p<.10
**p<.05